



Planting Design for Ecological Services

Presented by: Erin F. Stevens RLA, LEED AP

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OUR MISSION

Founded in 2016, Surculus is built on an insistence that, when executed superbly, urban design and landscape architecture are capable of addressing humanity's most challenging issues. We emphatically believe that well-designed spaces—no matter the scale—have great potential to engage and express commonality among otherwise unacquainted cultural and socioeconomic cross-sections while providing biodiversity, increasing resilience, activating latent economic possibility, and promoting mental, emotional, and physical well-being. A small firm with a large mission, we understand that the designs we create have the potential to persist and change for many years to come; therefore, careful attention to even the smallest details is essential. Our greatest passion is recognizing the unique ecological, social, and functional potentials in specific sites and working tirelessly to help them come to life. We are focused energetically on urban resilience and effectively integrating ecological and organic systems into human-affected contexts. In doing so, we create spaces that engage people with their communities and with the ecological processes occurring around them.

Using a delicate balance of art and science, our designs embrace complex social, civic, and ecological processes to create dynamic, engaging, and functional landscapes.

Explore our unique design approach below



Encourage Thriving
Communities



(Re)establish Ecosystems



Inspire Time
Outside



Invigorate
Underutilized Spaces



Build Resilience



Bring the Built
Environment into
Better Balance with
Nature

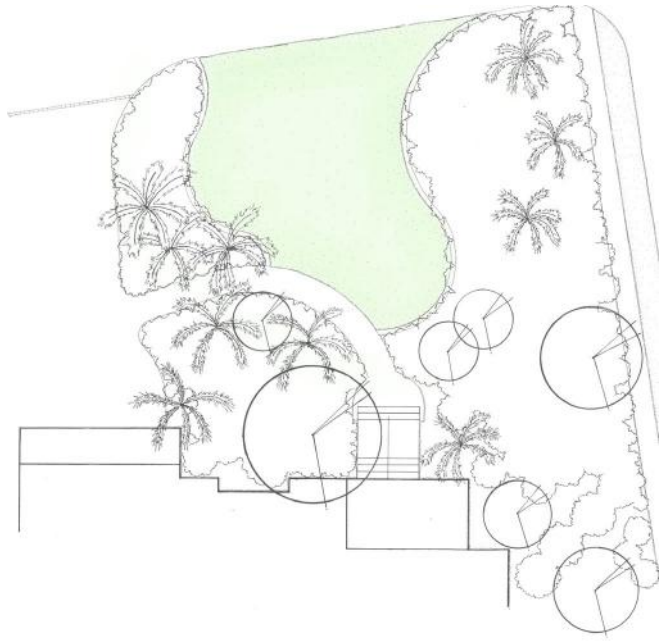
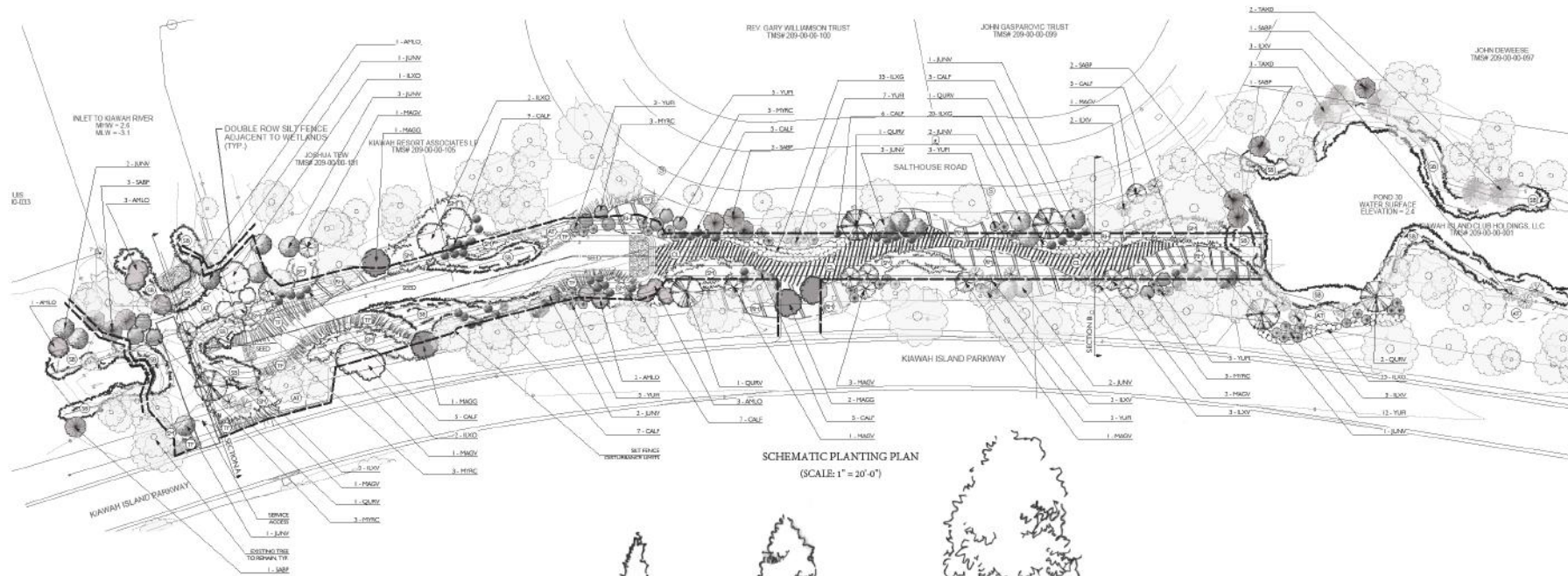
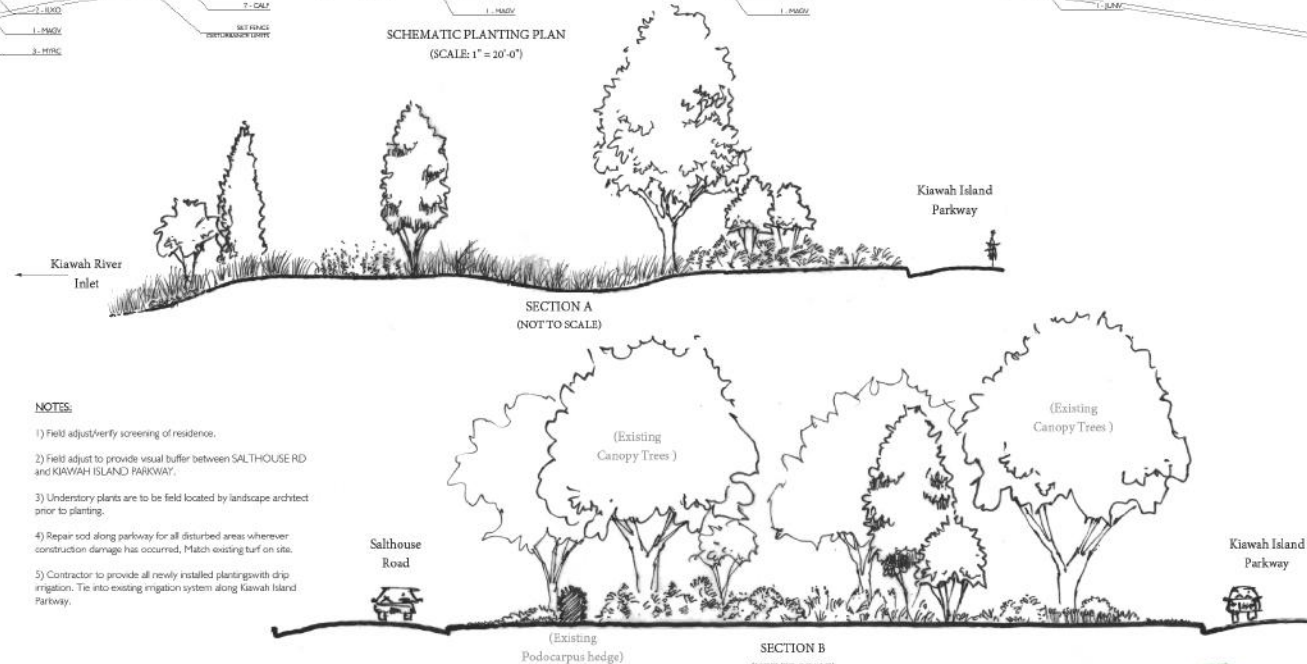


Photo by Camilla Cerea, Audubon National



SCHMATIC PLANTING PLAN
(SCALE: 1" = 20'-0")

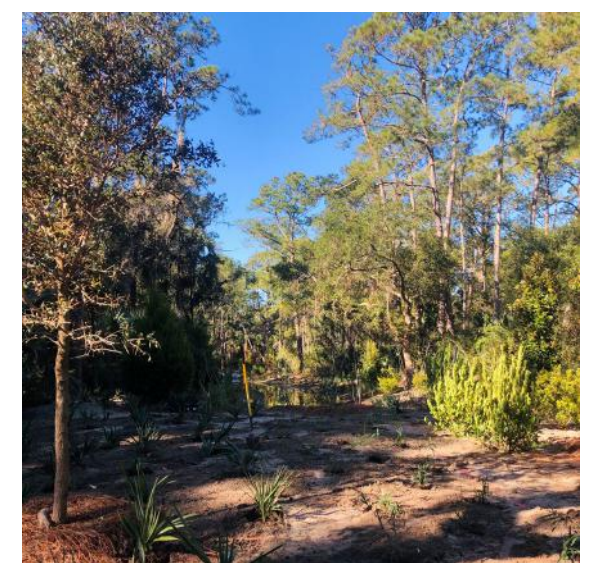
PLANT SCHEDULE	QTY	SYMBOL/COMMON	ROW PLANT	NOTES
AKG0	17	Ardisia cuneata / Coastal Strawberry	5'-0" height, 8.8" S	Full Natural Form
BJ20	5	Bursera / American Holly	8'-0" height, 8.8" S	Full Natural Form
BJ21	17	Bursera / American Holly	8'-0" height, 8.8" S	Full Natural Form
BJ22	18	Juniperus virginiana / Blue Juniper / Eastern Red Cedar	6'-0" height, 8.8" S	Full Natural Form
MAG0	4	Magnolia grandiflora / Southern Magnolia	8'-0" height, 8.8" S	Full Natural Form
MAG1	11	Magnolia virginiana / Sweetbay Magnolia	8'-0" height, 8.8" S	Full Natural Form
MHC	15	Myrica carolinensis / Wax Myrtle	4'-0" height, 8.8" S	Full Natural Form
QJ21	6	Quercus virginiana / Live Oak	7'-0" height, 8.8" S	Full Natural Form
SAP	11	Sabal palmetto / Cabbage Palm	18'-12" height, 8.8" S	Full Natural Form, Plant Height to be used as a field guide to determine if a plant is suitable for the site.
1000	9	Taxodium distichum / Bald Cypress	8'-0" height, 8.8" S	Full Natural Form
Shrub				
GL2	54	Geijocarpus parviflorus / Carolina Spicebush	7 gal	Full Natural Form, Containerized Material, Dark pink flowers
GL20	80	Melicope / Holiday Holly	7 gal	Full Natural Form, Containerized Material, Black flowers 90" H.C.
HI	225	Rhus typhina / Smoke Tree	7 gal	Full Natural Form, Containerized Material, 42" O.C.
SM	200	Smilax latifolia / Dwarf Palmetto	3 gal	Full Natural Form, Containerized Material, 48" O.C.
HR	40	Rosa pratincola / Alabama Rose/Hollyhock	3 gal	Full Natural Form, Containerized Material, Cream/White flowers, 36" H.C.
Shrub/Tree				
GL	300	Geijocarpus parviflorus / Inland Spicebush	3 gal	Full Natural Form, Containerized Material, Plant 30" H.C.
HR	325	Rosa pratincola / Florida Rose	3 gal	Full Natural Form, Containerized Material, Plant 5'-0" O.C.
IP	150	Ipomoea pes-caprae / Sweet Potato Bush	1 gal	Full Natural Form, Containerized Material, Plant 48" O.C.
Shrub/Tree				
AT	200	Ardisia cuneata / Strawberry	4" Pots	Full Natural Form, Containerized Material, Plant 12" H.C., Reddish Orange flowers, 60 SURSTU/1008
Shrub				
SD2	700	UNIDENTIFIED	SD2	SD2 to be located in bottom of drainage ditch.



- NOTES:
- Field adjust/verify screening of residences.
 - Field adjust to provide visual buffer between SALTHOUSE RD and KIAWAH ISLAND PARKWAY.
 - Underside plants are to be field located by landscape architect prior to planting.
 - Repair sod along parkway for all disturbed areas: wherever construction damage has occurred, Match existing turf on site.
 - Contractor to provide all newly installed plantings with drip irrigation. Tie into existing irrigation system along Kiawah Island Parkway.

KIAWAH ISLAND COMMUNITY ASSOCIATION
POND 30 OUTFALL PLANTINGS
SCHMATIC PLANTING PLAN
06/02/2020 by ADO

SURCULUS
Landscape Architecture
1111 B Road Street, Charleston, SC 29411
www.surculuslandscape.com / 843.738.3240





CHIONANTHUS VIRGINICUS,
FRINGE TREE



ACER BUERGERIANUM,
TRIDENT MAPLE



EUPATORIUM COELESTINUM,
WILD AGERATUM



CALLIGARPA AMERICANA,
BEAUTY BERRY



SABAL MINOR,
DWARF PALMETTO



CLETHRA ALNIFOLIA,
SWEETPEPPER BUSH



COONTIE PALM - HOST PLANT FOR THE ATALA BUTTERFLY



ZAMIA PUMILA,
COONTIE PALM



WINGED SUMAC - HOST PLANT FOR THE LUNA MOTH



ILEX X ATTENUATA 'SAVANNAH',
SAVANNAH HOLLY



PLATANUS OCCIDENTALIS,
AMERICAN SYCAMORE



SOLIDAGO RUGOSA,
GOLDENROD



SOLIDAGO RUGOSA, GOLDENROD



GOLDENROD - HOST PLANT FOR THE WAVY-LINED
EMERALD MOTH



RHUS COPALLINA,
WINGED SUMAC

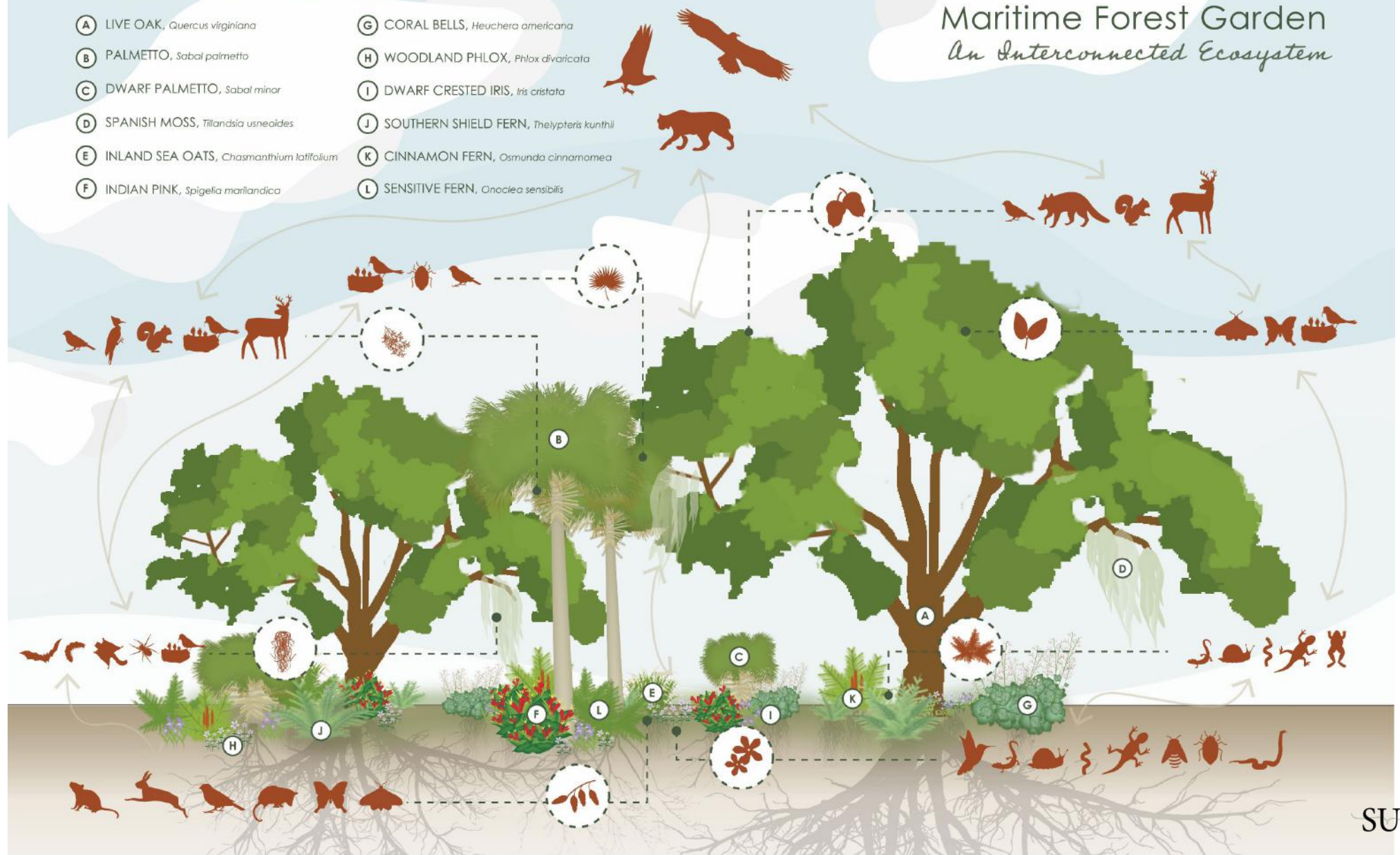


MUHLENBERGIA FILIPES,
SWEETGRASS

CAN YOU FIND THESE PLANTS IN THE GARDEN?

- | | |
|---|--|
| (A) LIVE OAK, <i>Quercus virginiana</i> | (G) CORAL BELLS, <i>Heuchera americana</i> |
| (B) PALMETTO, <i>Sabal palmetto</i> | (H) WOODLAND PHLOX, <i>Phlox divaricata</i> |
| (C) DWARF PALMETTO, <i>Sabal minor</i> | (I) DWARF CRESTED IRIS, <i>Iris cristata</i> |
| (D) SPANISH MOSS, <i>Tillandsia usneoides</i> | (J) SOUTHERN SHIELD FERN, <i>Thelypteris kunthii</i> |
| (E) INLAND SEA OATS, <i>Chasmanthium latifolium</i> | (K) CINNAMON FERN, <i>Osmunda cinnamomea</i> |
| (F) INDIAN PINK, <i>Spigelia marilandica</i> | (L) SENSITIVE FERN, <i>Onoclea sensibilis</i> |

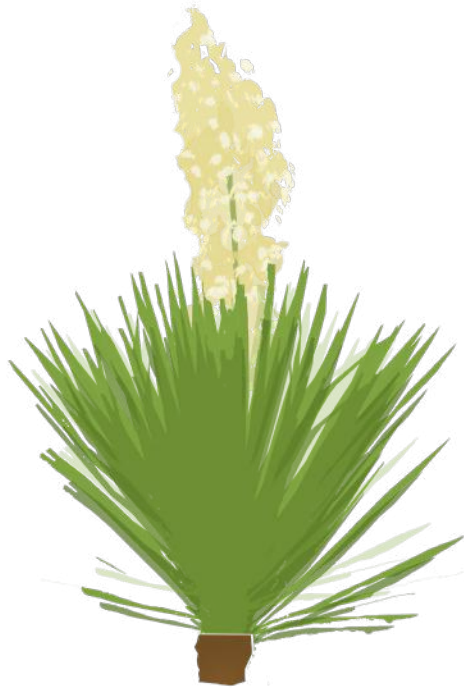
Maritime Forest Garden
An Interconnected Ecosystem





LIKELY ANALYSIS FACTORS

- Habitat Value for Microbes, Fungi, Insects, Birds, and other Wildlife
- Relationships with Other Plants
- Soil Type / Composition / pH – Existing and Target Conditions
- Elevation
- Visibility / Aesthetics
- Salinity of Soils, Air, and Adjacent Waterbodies
- Flood Susceptibility from Tidal Inundation
- Flood Susceptibility from Stormwater Inundation
- Groundwater Tables
- Existing Vegetation
- Pre-development Plant Communities
- Susceptibility to Vehicular Impacts (air, water, and physical)
- Light Patterns
- Erosion Potential



SCHS
CIRC
ECHINACEA MI
YURJ

SCHS
YURJ
CIR
ECHINACEA MI



STOL
PHL
CARC

RUOH
SCT
AMLO

NATIVE BIRD AND POLLINATOR BED PLAN



NATIVE BIRD AND POLLINATOR BED ELEVATION



PLANT	QTY	NOTES	DATE	BY
AMLO	1	Anemone obovata / Coastal Sandberry	6-8" HIGHER, 8-8"	Full Notes of Form; Container and Material; Purple Flowers; Plant 18" x 18" x 18"
YURJ	2	Yucca filamentosa / Adam's Needle / Flax	2 gal.	Full Notes of Form; Container and Material; Green/White; Purple; Flax; Plant
PHL	11	Asplenium platyneuron / Fern	1 gal.	Full Notes of Form; Container and Material; Plant 15" x 15" x 15"; Purple; Green; Plant
CIRC	7	Cirsium discolor / Milk Thistle	3 gal.	Full Notes of Form; Container and Material; Plant 15" x 15" x 15"; Purple; Green; Plant
STOL	18	Stachys recta / Purple Coneflower	1 gal.	Full Notes of Form; Container and Material; Purple; Flowers; Plant 18" x 18" x 18"
RUOH	10	Rudbeckia hirta / Smooth Purple Coneflower	3 gal.	Full Notes of Form; Container and Material; Purple; Flowers; Plant 18" x 18" x 18"
SCA	18	Scilla maritima / Pale Purple Coneflower	3 gal.	Full Notes of Form; Container and Material; Purple; Flowers; Plant 18" x 18" x 18"
SCA	10	Scilla maritima / Eastern Purple Coneflower	3 gal.	Full Notes of Form; Container and Material; Purple; Flowers; Plant 18" x 18" x 18"
PHL	25	Phlox pilosa / Downy Phlox	3 gal.	Full Notes of Form; Container and Material; Plant 18" x 18" x 18"; Purple; White; Plant
RUOH	16	Rudbeckia hirta / Black-eyed Susan	3 gal.	Full Notes of Form; Container and Material; Plant 18" x 18" x 18"; Purple; Green; Plant
STOL	15	Stachys recta / Smooth Purple	3 gal.	Full Notes of Form; Container and Material; Purple; Flowers; Plant 18" x 18" x 18"
SCA	75	Scilla maritima / Cherokee Sage	3 gal.	Full Notes of Form; Container and Material; Plant 6-8" x 6-8" x 6-8"
STOL	100	Stachys recta / Little Bluestem	3 gal.	Full Notes of Form; Container and Material; Plant 18" x 18" x 18"

GOVERNOR'S MANSION
NATIVE PLANT HABITAT
PHASE 3 LANDSCAPE CONCEPT
05/19/2020 by ADO







- 80 Milkweeds native to North America
- At least 17 with native range in South Carolina
- Non-native Variety most frequently sold, yet harmful to migratory populations



Asclepias curassavica



Asclepias tuberosa



Asclepias perennis



Asclepias incarnata



Asclepias syriaca



MAGNOLIA VIRGINIANA,
SWEETBAY MAGNOLIA



TAXODIUM DISTICHUM,
BALD CYPRESS



AMELANCHIER CANADENSIS'
SERVICEBERRY



AMELANCHIER CANADENSIS,
SERVICEBERRY



HYPERICUM HYPERICOIDES,
ST. ANDREWS CROSS



AESCULUS PAVIA
RED BUCKEYE



BLUESTEM GRASS - HOST PLANT FOR THE WOOD
NYMPH BUTTERFLY



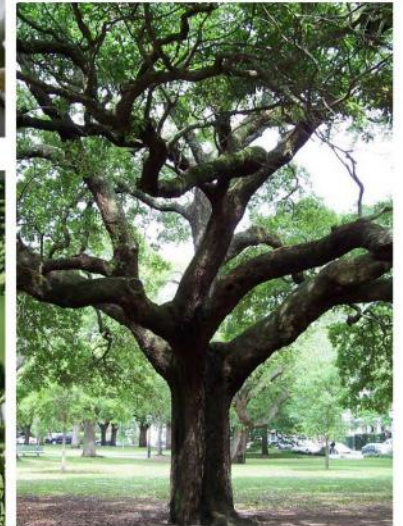
SCHIZACHYRIUM SCDPARIUM 'STANDING OVATION',
BLUESTEM GRASS



MYRICA CERIFERA,
WAX MYRTLE



JUNIPERUS VIRGINIANA,
EASTERN RED CEDAR



QUERCUS VIRGINIANA,
LIVE OAK (TRANSPLANT AND NURSERY MATERIAL)



SWAMP ROSE-MALLOW - HOST PLANT FOR THE
CHECKERED SKIPPER BUTTERFLY



HIBISCUS MOSCHEUTOS,
SWAMP ROSE-MALLOW



MARSH



PINUS TAEDA OR PALUSTRIS,
LONF LEAF OR LOBLOLLY PINE



SERENGA REPENS,
SAW PALM



ENCOURAGE A DIVERSE POPULATION OF INSECTS
 OFFER SHELTER AND NESTING SITES FOR SOLITARY INSECTS
 SOLITARY INSECT & BEE HOTELS



CELEBRATING BIODIVERSITY
 HABITAT CREATION
 POLLINATOR AND FOOD SOURCES



NATIVE WILDFLOWER MEADOW
 CREATION OF POLLINATOR HABITAT
 CONNECTING PEOPLE TO THE NATIVE LANDSCAPES



BIODIVERSITY AND ARTFUL OPEN SPACE
 INSPIRATION - 10,000 SUNS,
 AN ANNUAL SUMMER-LONG BOTANICAL PERFORMANCE
 IN WHICH SUNFLOWER SEEDS ARE PLANTED AND
 NURTURED BY THE COMMUNITY
 CUT FLOWER GARDEN/ SUNFLOWERS/ ZINNIAS



ENCOURAGE CAVITY-NESTING ANIMALS
 BAT BOXES
 BLUEBIRDS NESTING BOXES
 OWL NESTING BOXES




LANDSCAPE KEY




CELEBRATING BIODIVERSITY
HABITAT CREATION
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ENCOURAGE CAVITY-NESTING ANIMALS
BAT BOXES
BLUEBIRDS NESTING BOXES
OWL NESTING BOXES

ENTRANCE TO MULTI-USE TRAILS
TO INCLUDE (2) PROPOSED TREES AND/ OR
TRANSPLANTED OAKS WITH LOW SHRUBS,
PERENNIALS AND GRASSES (TYP.)

PROPOSED LOCATIONS FOR TRANSPLANTED
OAKS WITH ADDITIONAL SHRUBS AND LARGE
EVERGREENS FOR SCREENING

NATIVE WILDFLOWER MEADOW, TRANSPLANTED LIVE
OAKS AND ADDITIONAL PLANTINGS PROPOSED FOR
CURRENT CLEARED AREA

PROPOSED SCREENING PLANT MATERIAL
LARGE EVERGREENS (TYP.)

MULTI-USE TRAILS - PLANTATION MIX,
WIDTH VARIES (TYP.)

PLACES TO "PAUSE"

PROPOSED SCREENING PLANT MATERIAL
LARGE EVERGREENS (TYP.)

PROPOSED TREE (TYP.)

EXISTING TREE (TYP.)

ENTRANCE TO MULTI-USE TRAILS
TO INCLUDE (2) PROPOSED TREES AND/ OR
TRANSPLANTED OAKS WITH LOW SHRUBS,
PERENNIALS AND GRASSES (TYP.)

SYMBOLIC PLANT MATERIAL

BURIAL SITE

PLACE TO "PAUSE" - MARSH OVERLOOK
AT GRADE VIEWING AREA

EXISTING TREES TO REMAIN, SELECTIVE
CLEARING AND ADDITIONAL PLANTINGS
PROPOSED FOR SCREENING

MULTI-USE PATH TO CONTINUE DOWN
KIAWAH RIVER DR. PROPOSED MULTI-USE
TRAILS TO TIE INTO THIS PATHWAY

EXISTING TREE CANOPY TO REMAIN,
SELECTIVE CLEARING AND ADDITIONAL
PLANTINGS PROPOSED FOR SCREENING

LARGE EVERGREENS FOR SCREENING (TYP.)

PROPOSED
SCREENING - LARGE
EVERGREENS (TYP.)

POTENTIAL
GREETING STATION

POTENTIAL MAIL
KIOSK

PROPOSED
SCREENING - LARGE
EVERGREENS (TYP.)

PROPOSED MULTI-USE TRAIL TO CONNECT TO EXISTING

MULTI-USE PATH (TYP.)

PROPOSED TREE (TYP.)

EXISTING TREE (TYP.)

MULTI-USE TRAILS - PLANTATION MIX (TYP.) - TO BE
FIELD LOCATED BASED ON EXISTING CONDITIONS

LANDSCAPE ARCHITECTURE
10000 AC TOTAL
INCLUDES 8000 AC
RESIDENTIAL DEVELOPMENT
2000 AC FRESHWATER
WETLANDS



BRIDGE POINTE ECOLOGICAL PARK



SITE HISTORY

The site of the Bridge Pointe Ecological Park was previously home to twelve Shadowmoor townhomes. After suffering 4 floods in 3 years, The City of Charleston purchased the properties with support from a FEMA grant. The townhomes were removed from the site in 2019.

In 2020, the City of Charleston was awarded a grant from the U.S. Fish and Wildlife Service to transform the site into a stormwater storage space. With additional funding from the City of Charleston's Stormwater Department and Parks and Recreation Department, the stormwater storage space also functions as a neighborhood park.



RE-NATURALIZATION

The initial construction of the surrounding neighborhoods disrupted many ecological and hydrological processes occurring onsite. While this project will never be able to fully restore the site to a completely natural environment, by planting native plants and mimicking natural systems, the space will begin to support a healthy ecology.



WATER MANAGEMENT

After a rain event, the Bridge Pointe Park will hold up to 10,000 gallons of water. Combined with other water management strategies across the Church Creek Drainage Basin, this park will help to reduce localized flooding during extreme weather events.

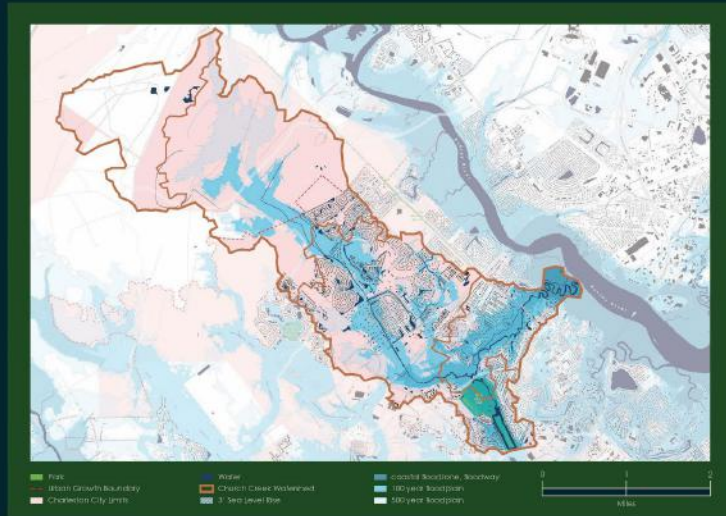


BRIDGE POINTE ECOLOGICAL PARK STORM WATER MANAGEMENT



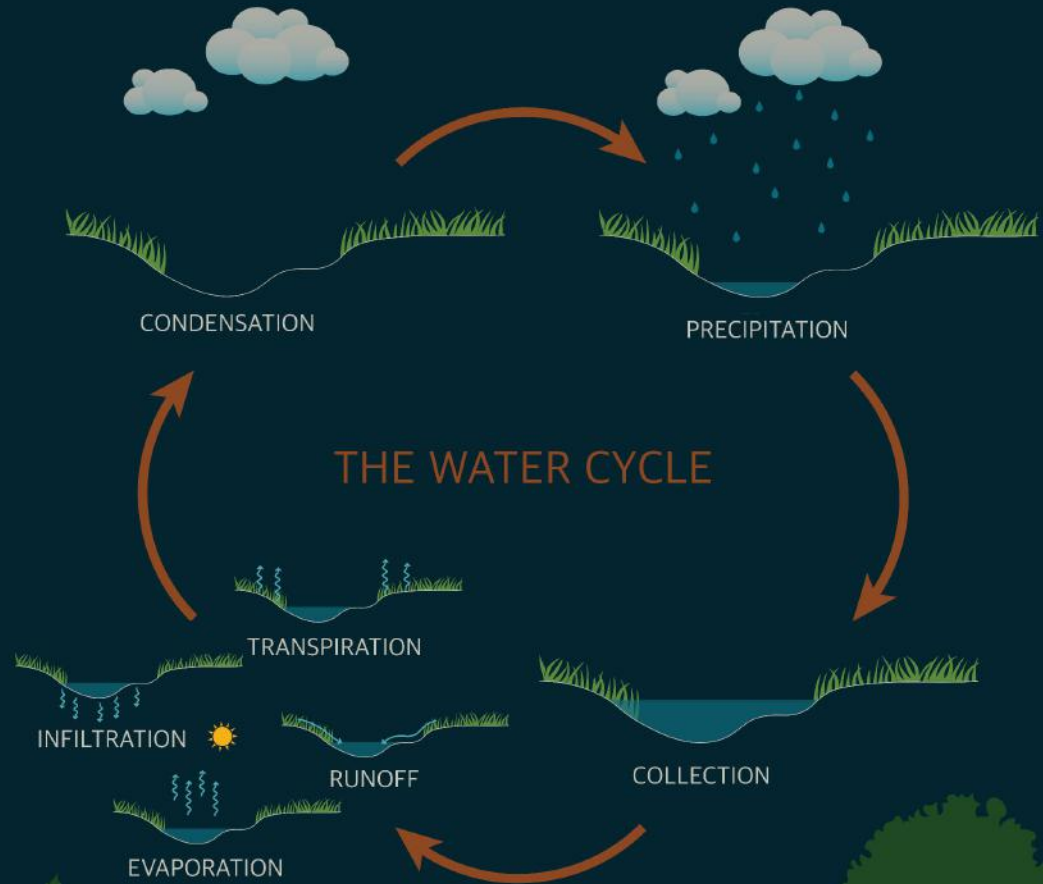
WATERSHED HISTORY

The Bridge Pointe Ecological Park is located within the Church Creek drainage basin which drains over 10,000 acres located along the Ashley River. The Church Creek drainage basin was once made up of primarily marsh and lowland hardwood forests that were ditched and converted to rice fields and phosphate mines in the 1700s & 1800s. Today the lower sections of the basin are largely developed, mostly as single-family residential housing.



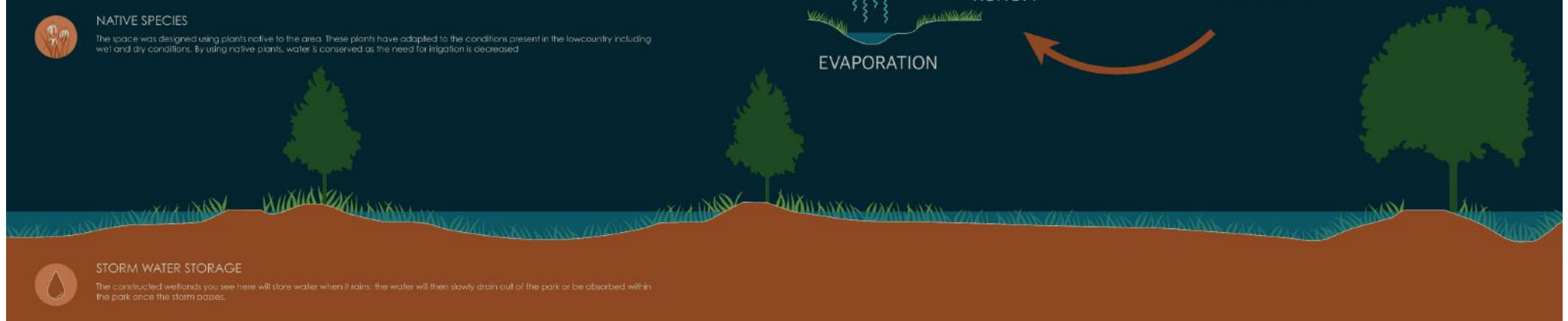
NATIVE SPECIES

The space was designed using plants native to the area. These plants have adapted to the conditions present in the lowcountry including wet and dry conditions. By using native plants, water is conserved as the need for irrigation is decreased.



STORM WATER STORAGE

The constructed wetlands you see here will store water when it rains; the water will then slowly drain out of the park or be absorbed within the park once the storm passes.





NATIVE PLANTINGS

AQUATIC PLANT ZONE



GREAT BLUE HERON

WHITE TOP SEDGE
RHYNCHOSPORA COLORATA

AQUATIC MILKWEED
ASCLEPIAS PERENNIS

PICKEREL WEED
PONTEDERIA COCORATA

ARROWHEAD
TITICACIA PODOPHYLLUM

SWEET FLAG
ACORUS CALAMUS



AQUATIC PLANT ZONE

WATER MANAGEMENT

Native Plants in the aquatic plant zone stabilize shorelines, absorb excess nutrients, and oxygenate water.



NATIVE PLANTINGS

LOWLAND PLANT ZONE

EASTERN RED CEDAR
JUNIPERUS VIRGINIANA

WAX MYRTLE
MYRICA CERIFERA

YAUPON HOLLY
ILEX VOMITORIA

AMERICAN BEAUTYBERRY
CAUCARPA AMERICANA

CORAL BEAN
ERYTHRINA HERBACEA



WATER MANAGEMENT

Native Plants in the lowland plant zone absorb water and encourage infiltration.

LOWLAND PLANT ZONE



NATIVE PLANTINGS

HIGH GROUND PLANT ZONE

AMERICAN ELM
ULMUS AMERICANA

EASTERN RED BUD
CERCIS CANADENSIS

VIRGINIA SWEETSPIRE
ITEA VIRGINICA

SWITCH GRASS
PANICUM VIRGATUM

YAUPON HOLLY
ILEX VOMITORIA



WATER MANAGEMENT

Native Plants in the high ground plant zone absorb water to reduce run-off.

HIGH GROUND PLANT ZONE

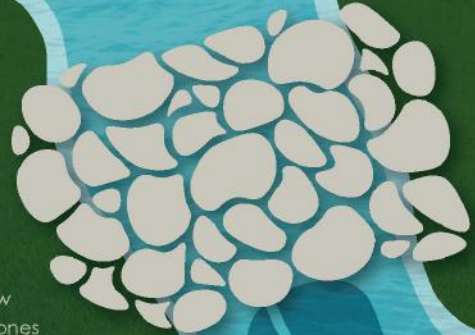




STONE WEIRS

STORM WATER MANAGEMENT

A weir is a small barrier essentially acting like a small-scale dam. Weirs are typically built from stone, across a stream or river to control and raise the water level slightly on the upstream side. A weir generally allows the water to flow between the stones while the stones themselves stabilize the bank.



STONE WEIRS



WATER MANAGEMENT

Stone weirs help prevent erosion by stabilizing banks as water passes through the system.



NATIVE SPECIES

A HEALTHY WATERSHED ECOSYSTEM

BROWN BATS

Bats live in trees and little homes called bat boxes. Brown bats like to hang upside down from branches and can eat up to 1,000 mosquitoes per hour and are one sign of a healthy ecosystem!



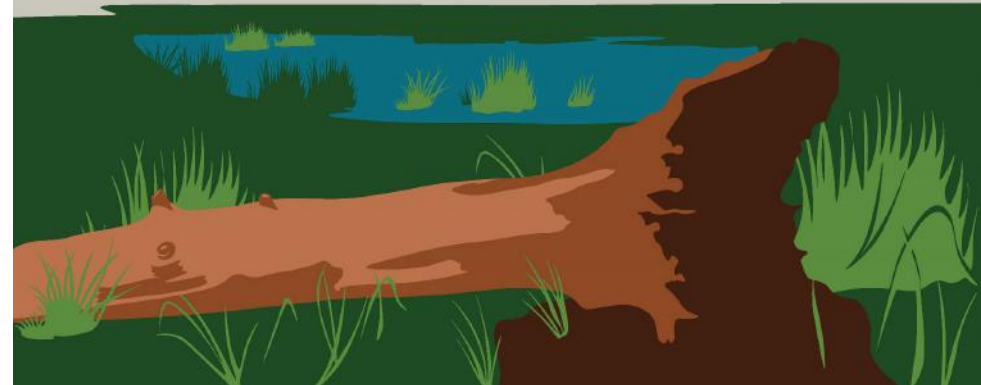
MONARCH CATERPILLARS AND BUTTERFLIES

Monarch caterpillars eat milkweed leaves to get strong before they create a chrysalis and turn into a monarch butterfly.



FALLEN TREES AND BRANCHES

Fallen trees and branches provide a home to pollinators, birds and small animals. Natural loose plantings mimic nature's freshwater wetland habitat.



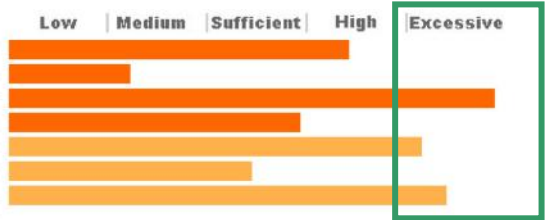


Date: 9/5/2019
 Soil Report for:
 STEVENS, ERIN
 91-B BROAD ST
 CHARLESTON SC, 29401

Lab Number: 19090019
 Account: COCHRLS
 Client Id: STEVENS, ERIN
 Sample Id: #4
 Soil Code: 2

Analysis Results

Soil pH	7.0
Buffer pH	7.75
Phosphorus (P)	91 lbs/acre
Potassium (K)	88 lbs/acre
Calcium (Ca)	3692 lbs/acre
Magnesium (Mg)	540 lbs/acre
Zinc (Zn)	103.6 lbs/acre
Manganese (Mn)	32 lbs/acre
Boron (B)	4.8 lbs/acre
Copper (Cu)	6.8 lbs/acre
Sodium (Na)	69 lbs/acre
Sulfur (S)	lbs/acre
Soluble Salts	.172 mmhos/cm
Nitrate Nitrogen	ppm
Organic Matter	% (LOI)



Calculations

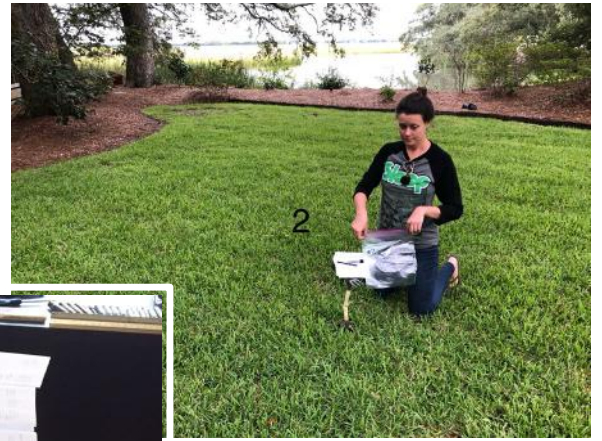
Cation Exchange Capacity (CEC)	Acidity	Ca	Base Saturation			Total
13.7meq/100g	2meq/100g	67%	Mg 16%	K 1%	Na 1%	86%

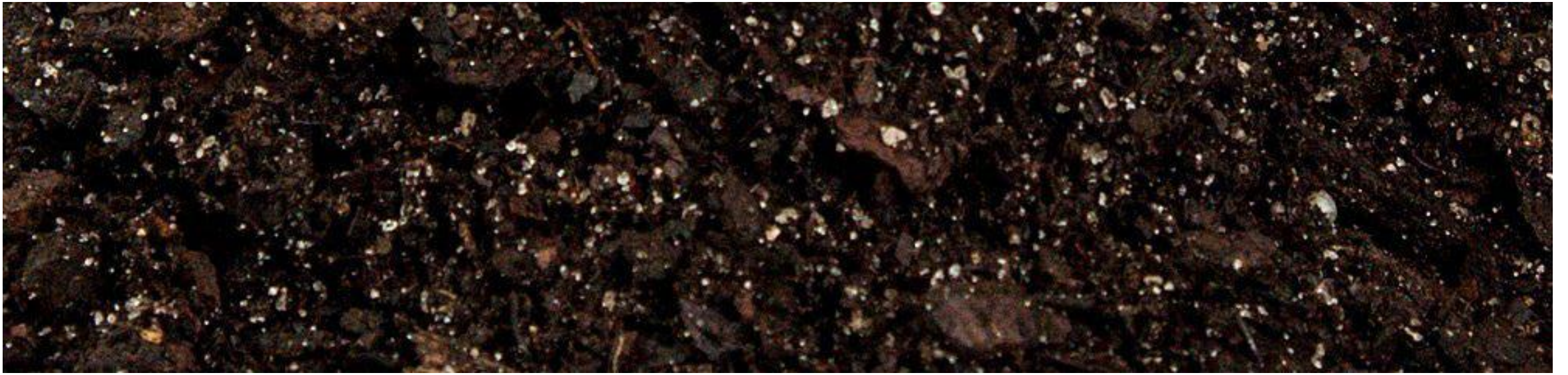
Recommendations

Crop: Ornamental/Shade Trees
 Lime: No Lime Required
 *See Comments: 332,334,650,654

Comments

- 332 Layout a rectangular area to be fertilized around the tree so that the entire branch spread is included. Determine the area of the rectangle and in the early spring (March 1-April 15), broadcast 32 lbs 15-0-15 or equivalent fertilizer per 1,000 square feet.
- 334 If grass, ivy, or other plants under the trees are fertilized, it will not be necessary to add fertilizer





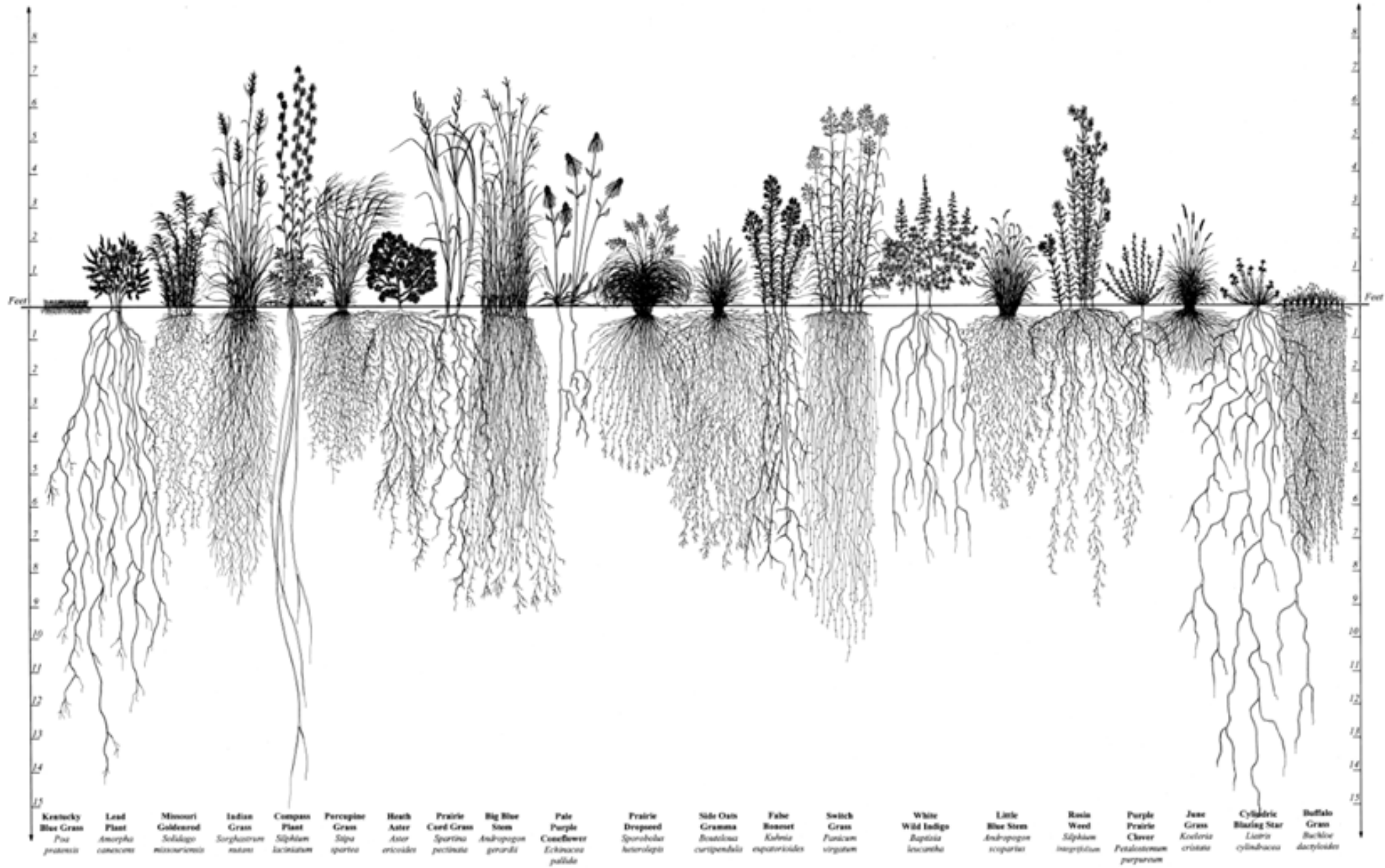


Soil Cleanup:

1. Phytoextraction – plants pull pollutants from soil and store in above-ground biomass
2. Phytofiltration – roots or plant parts trap pollutants to decrease mobilization in soil
3. Phytostabilisation, phytovolatilisation and phytodegradation – chemical changes to contaminants

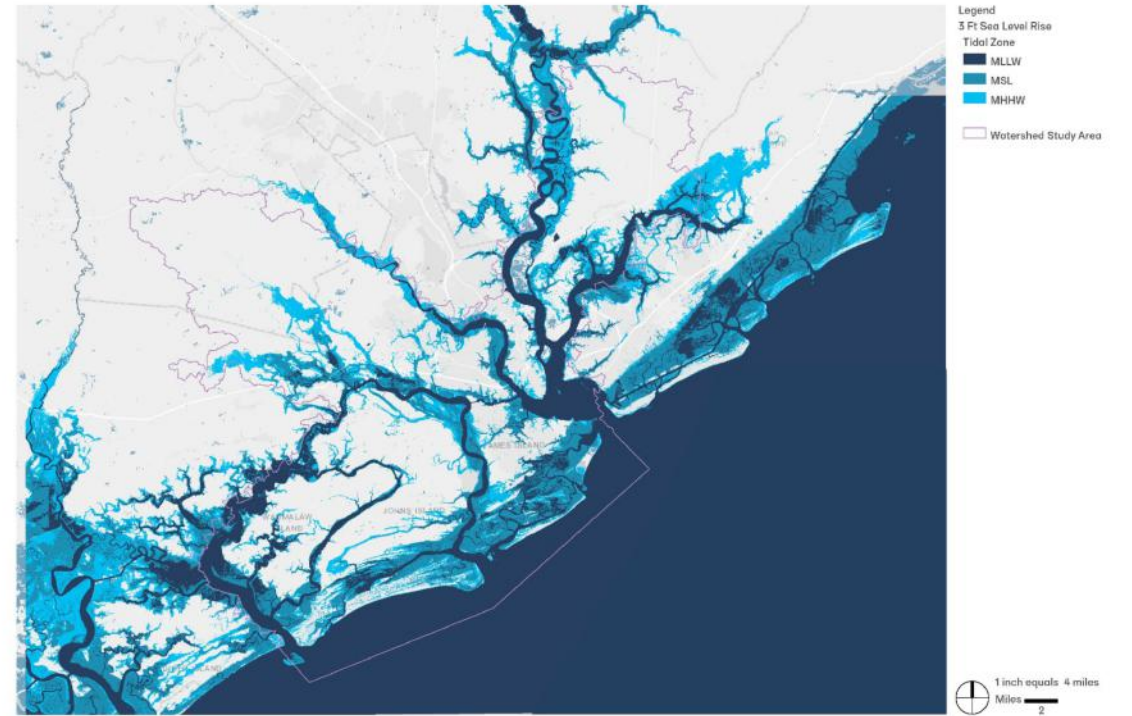
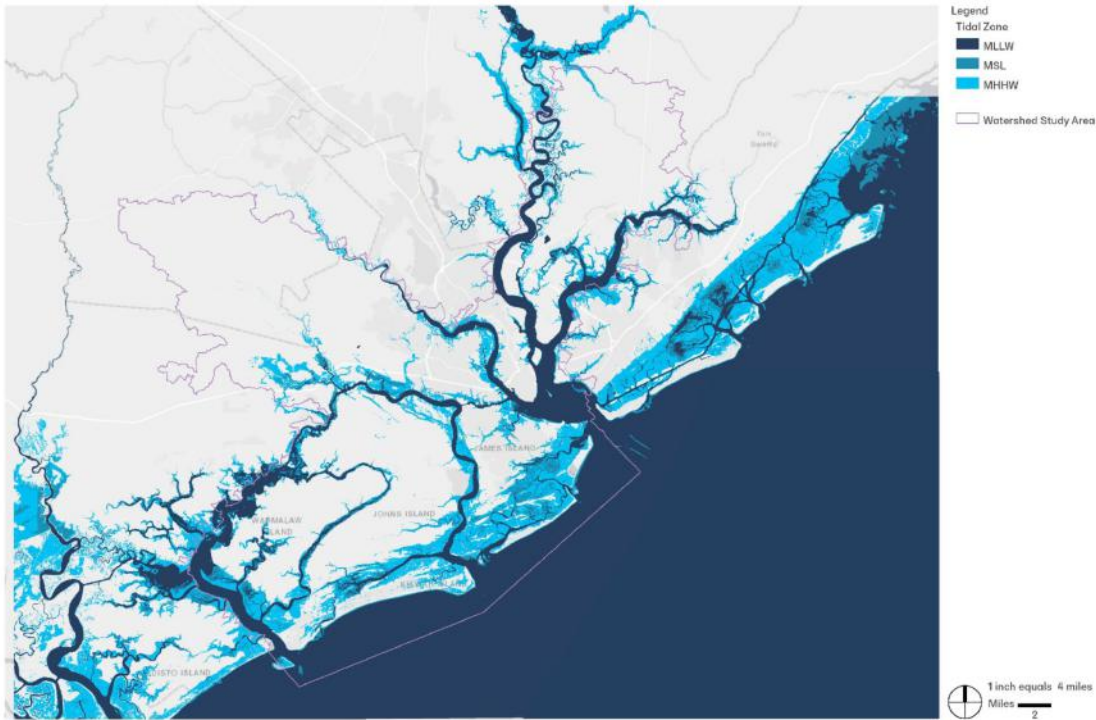
**All require different treatments, so it's important to understand what the intended function is for each plant species.
Multiple processes can occur in one landscape plan.**





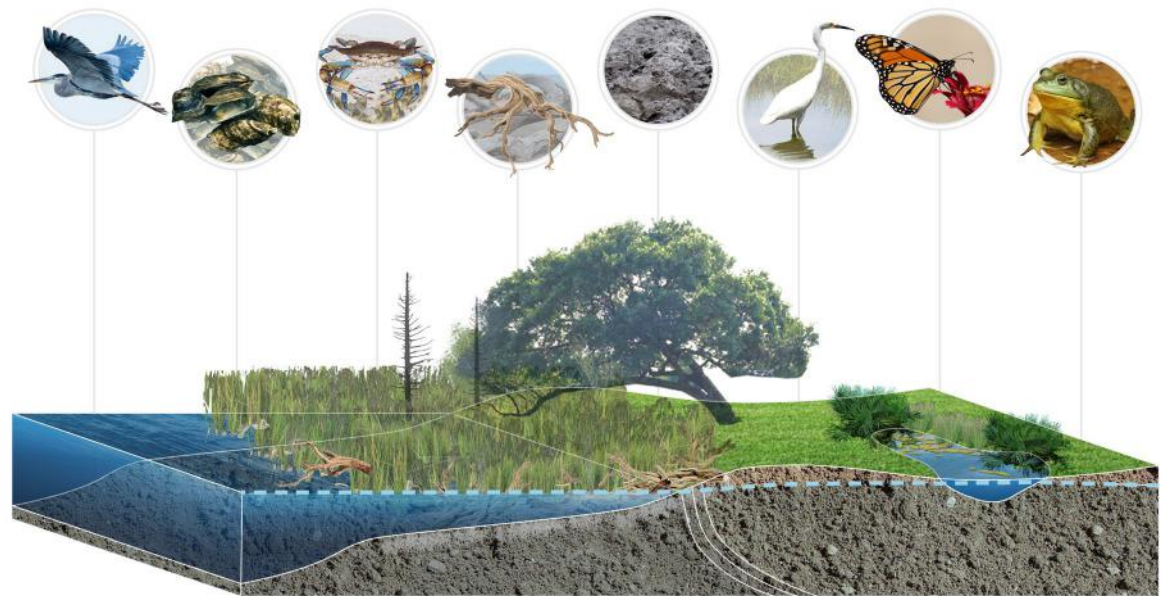
Root Systems of Prairie Plants

Charleston Watersheds + Marsh Migration





EXISTING CONDITIONS



SEA LEVEL RISE WITH ALLOWANCE FOR MARSH MIGRATION AND GROUNDWATER SURFACING

Takeaways:

1. Plant communities ARE machines serving specific functions.
2. Plant communities function as complex, ever-changing, and highly integrated systems NOT individual specimens be cared for independently
3. Designers / Installers / Management Crews MUST communicate better to understand the intended purposes and continued functioning of landscape systems.
4. Embrace the dynamic nature inherent in landscape. Not moving toward a finished product.
5. Management (dynamic) over Maintenance (static).

